

CIRCULAR CONNECTOR INTEGRATED IN HINGE

BACKGROUND

[0001] Power and data can be provided from one electronic device to another over cables that can include one or more wires, fiber optic cables, or other conductors. Connector inserts can be located at each end of these cables and can be inserted into connector receptacles in the communicating or power transferring electronic devices.

[0002] Given the large amounts of data that can be transferred among connected devices, it can be desirable that these connector receptacles be capable of supporting high data rates. That is, it can be desirable that these connector receptacles provide a high signal quality or signal integrity to allow high-speed data transfers between electronic devices.

[0003] Some of these electronic devices become tremendously popular. As a result, electronic devices having these connector receptacles can be sold in very large quantities. Therefore, it can be desirable that these connector receptacles be readily manufactured.

[0004] Users can connect and disconnect these connector inserts and connector receptacles many times during a devices' lifetime. On occasion, a wrong connector insert can be inserted a connector receptacle. That is, a connector insert of a first type of connector system can be inserted into a connector receptacle of a second type of connector system. If this connector receptacle breaks or shows signs of wear prematurely, it can reduce user satisfaction and reflect poorly on the device.

[0005] These connector receptacles can be located along a side or edge of an electronic device. But some devices can be very thin to a point where it can be difficult to find a location for a connector receptacle. Therefore, it can be desirable that these connector receptacles be able to be positioned in nonstandard locations in an electronic device.

[0006] Thus, what is needed are connector receptacles that can provide a high signal quality or signal integrity to allow high speed data transfers, can be reliably manufactured, can be durable and have good wear performance, and can be positioned in nonstandard locations in an electronic device.

SUMMARY

[0007] Accordingly, embodiments of the present invention can provide connector receptacles that can provide a high signal quality or signal integrity to allow high-speed data transfers, can be reliably manufactured, can be durable and have good wear performance, and can be positioned in nonstandard locations in an electronic device.

[0008] These and other embodiments of the present invention can provide connector receptacles that can provide a high signal quality or signal integrity by utilizing a comprehensive grounding scheme. The connector receptacle assembly can include robust ground connections. For example, a tongue of the connector receptacle can include a grounded center plate. The tongue can support ground contacts that extend from a housing towards a front edge of the tongue. The ground contacts can be folded back underneath themselves near the front edge of the tongue. The ground contacts can terminate in connection plates. The connection plates can be soldered, spot or laser welded, or otherwise attached to the center plate. This can provide a

good ground path between the ground contacts and the center plate. The tongue of the connector receptacle can also support ground pads on its top and bottom sides. These ground pads can connect to the center plate for further improvement in grounding.

[0009] These connector receptacles can also be well-grounded to their electronic devices. For example, the connector receptacle assembly can be mated with an endcap, where the endcap provides a connector tunnel or opening for a corresponding connector insert to enter when the corresponding connector insert is mated with the connector receptacle. The ground pads can be connected to, or be formed with, a backplate behind a portion of the housing. The ground pads can also be connected to, or formed along with, side tabs on a side of the housing, or the side tabs can be extensions of the center plate. The backplate and housing can include openings for fasteners. The fasteners can be inserted through the openings in the backplate and housing and into the endcap, thereby grounding the backplate to the endcap. The side tabs can also connect to the endcap thereby providing another ground path. The endcap can be grounded to a portion of a device enclosure, such as a portion of a hinge, using a gasket formed of conductive fabric over foam or other ground connection. The endcap can be held in place using a conductive or nonconductive adhesive, such as a conductive pressure-sensitive adhesive, a conductive temperature-sensitive or heat-activated adhesive, or other adhesive layer.

[0010] These connector receptacles can also be well-grounded with corresponding connector inserts when the connector receptacles are mated with the corresponding connector inserts. For example, a shield of the connector insert can connect to the connector tunnel of the endcap. Side ground contacts in the connector insert can contact side ground contacts on sides of the connector receptacle tongue. The side ground contacts on sides of the connector receptacle tongue can be located in notches in the tongue and can be formed by edges of the center plate. Front ground contacts in the connector insert can mate with the ground pads on the tongue of the connector receptacle, and ground contacts in the connector insert can connect to ground contacts on the tongue of the connector receptacle.

[0011] These and other embodiments can provide connector receptacles that can be readily manufactured. For example, a connector receptacle consistent with an embodiment of the present invention can be manufactured using primarily stamping and injection molding steps.

[0012] These and other embodiments can provide connector receptacles that can be durable and have good wear performance. On occasion, a user can plug a connector insert for a first type of connector system into a connector receptacle of a second type of connector system. These inadvertent insertions can damage a portion of a connector receptacle. Such damage can reduce a functionality of an electronic device housing the connector receptacle. One type of damage that can occur can be the lifting of a pin from a housing or a tongue of the connector receptacle. This lifting can cause the pin to be damaged by being pushed back into the connector receptacle.

[0013] Accordingly, these and other embodiments of the present invention can provide connector receptacle tongues where leading edges of contacts on the tongue are covered with an overmold. In these and other embodiments of the present invention, the leading edges of the tongue contacts